KRAMER ELECTRONICS, Ltd.

USER MANUAL

MATRIX SWITCHERS

Models:

VP-88

VP-84

VP-82

VP-66

VP-64

IMPORTANT: Before proceeding, please read paragraph entitled

"Unpacking and Contents"

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1   INTRODUCTION

Congratulations on your purchase of a Kramer Electronics RGBHV/ Balanced Stereo Audio Matrix Switcher. Since 1981 Kramer has been dedicated to the development and manufacture of high quality video/audio equipment. The Kramer line has become an integral part of many of the best production and presentation facilities around the world. In recent years, Kramer has redesigned and upgraded most of its line, making the best even better. Kramer's line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to the Kramer line of high quality matrix switchers, such as the one you have just purchased, Kramer also offers a full line of high quality distribution amplifiers, processors, interfaces, controllers and computer-related products. This manual includes configuration, operation and option information of the following RGBHV/ Balanced Stereo Audio Matrix Switchers. These VP series matrix switchers are similar in operation and features:

VP-88: 8x8 RGBHV/ Balanced Stereo Audio Matrix

VP-84: 8x4 RGBHV/ Balanced Stereo Audio Matrix

VP-82: 8x2 RGBHV/ Balanced Stereo Audio Matrix

VP-66: 6x6 RGBHV/ Balanced Stereo Audio Matrix

VP-64: 6x4 RGBHV/ Balanced Stereo Audio Matrix

1.1   A Word on Video/Audio Switchers

A video/audio switcher switches between several sources (inputs) and one or more acceptors (outputs). A switcher that allows several inputs to be connected to several outputs simultaneously is called a matrix switcher. Switchers may be of the electronic or mechanical type. Most matrices are of the active electronic type, with many crosspoints. Vertical Interval Switching, frequently used in video, ensures that the transition from one video source to another (such as switching between two genlocked cameras) is smooth and without interference. The switching and changeover is done during the blanked vertical interval period, when the transition is hidden from the eyes. Vertical Interval Switching is needed when recording or transmitting a video program involving several video sources, as in live broadcast, to ensure clean, undisturbed picture transitions. The switched sources should be genlocked. Matrices and switchers are sometimes RS-232 or RS-485/422 controlled. Each of these options is a way of remotely controlling a video/audio device (switcher, etc.) using a PC with a serial port, or another device that uses a similar communication protocol. The simplest connection between the RS-232 controller and the controlled device uses two wires (TRANSMIT, RECEIVE) and a common ground wire. Finally, the wide video bandwidth permits the matrix switchers to be used in the most demanding applications.

1.2   Factors Affecting Quality of Results

There are many factors affecting the quality of results when signals are transmitted from a source to an acceptor:

➢   **Connection cables** - Low quality cables are susceptible to interference, they degrade signal quality due to poor matching and cause elevated noise levels. They should therefore be of the best quality.

➢   **Sockets and connectors of the sources and acceptors** - So often ignored, they should be of highest quality, since "Zero Ohm" connection resistance is the target. Sockets and connectors also must match the required impedance (75ohm in video). Cheap, low quality connectors tend to rust, thus causing breaks in the signal path.

➢   **Amplifying circuitry** - Must have quality performance when the desired end result is high linearity, low distortion and low noise operation.

➢   **Distance between sources and acceptors** - Plays a major role in the final result. For long distances (over 15 meters) between sources and acceptors, special measures should be taken in order to avoid cable losses. These include using higher quality cables or adding line amplifiers.

➢   **Interference from neighboring electrical appliances** - These can have an adverse effect on signal quality. Balanced audio lines are less prone to interference, but unbalanced audio should be installed far from any mains power cables, electric motors, transmitters, etc. even when the cables are shielded.

2 SPECIFICATIONS

	VP-88, VP-84, VP-82, VP-66, VP-64
Configuration	8x8, 8x4, 8x2, 6x6, 6x4
Inputs	8(6) x3 video (RGB): 0.7 Vpp/75ohm, on BNCs
	1 Sync/Video Genlock with sync select switch 1Vpp/75ohm on a BNC.
	8(6) x2 Hs & Vs, TTL level/510 ohm or Video 0.7 Vpp/75ohm, on BNCs
	8(6) balanced stereo audio, +4dBm/33kohm, on detachable terminal blocks.
Outputs	8(6,4,2) x3 video (RGB): 0.7 Vpp/75ohm, on BNCs
	8(6,4,2) x2 Hs & Vs, TTL level/510 ohm or Video 0.7 Vpp/75ohm, on BNCs
	8(6,4,2) balanced stereo audio, +4dBm/33kohm, on detachable terminal blocks.
Output Level	RGB: 0.7 Vpp/75ohm Audio: +4dBm/150ohm (24Vpp max.)
Video S/N Ratio	74dB
Audio S/N Ratio	84dB unweighted, (1Vpp)
Video Bandwidth	> 300MHz
Audio Bandwidth	> 100klHz.
Video Crosstalk	<-50dB @ 5MHz
Audio THD	0.025% (1V, 1kHz)
Control Type	Manual, RS-232 or RS-485
Weight	3.5 kg (7.8 lbs.) to 2.9 kg (6.4 lbs.) Approx.
Dimensions (W x D x H)	19" x 7" x 3U
Power Source	230VAC, 50/60 Hz, (115VAC, U.S.A.)

3 HOW DO I GET STARTED?

The fastest way to get started is to take your time and do everything right the first time. Taking 15 minutes to read the manual may save you a few hours later. You don't even have to read the whole manual - if a certain section doesn't apply to you, you don't have to spend your time reading it.

4 UNPACKING AND CONTENTS

The items contained in your Kramer accessory package are listed below. Please save the original box and packaging materials for possible future transportation and shipment of the machine.

- ➢ Matrix Switcher
- ➢ Floppy diskettes or CD with PC control software
- ➢ AC Power cord
- ➢ This User Manual
- ➢ Kramer Concise Product Catalog/Catalog CD
- ➢ KRAMER Null Modem Adapter Connector
- ➢ 4 Rubber Feet

4.1 Optional Accessories

The following accessories, available from Kramer, can enhance implementation of your machine. For information regarding cables and additional accessories, contact your Kramer dealer.

❑ **VM-1055** – a 1:5 distribution amplifier for component video (RGBHV) signals can be inserted serially between one output of the VP Matrix and several (up to 5) RGBHV acceptors for signal distribution. The **VM-1055** has five separate channels, each of which is a high bandwidth 1:5 DA. In its typical application, it is designed to accept a component video source such as RGBHV, RGBS or Y, R-Y, B-Y, etc., and provide five buffered outputs to drive monitors, projectors, or other receiving devices. In addition to a typical RGBHV application, the five channels can operate independently, allowing the unit to be used as five separate 1:5 DA's for composite video or other formats. Bandwidth of over 300MHz ensures that the **VM-1055** remains transparent even in critical broadcast or high-resolution applications. It is housed in a rugged, professional, rack mountable enclosure requiring only one vertical space in a standard 19" rack.

❑ **VP-102 (**and the new **VP-103) -** a high performance VGA to BNC converter which is designed to allow a single VGA/XGA source to drive a local monitor and a compatible large display device simultaneously. It can be inserted between a VGA/XGA source (such as a PC) and the input of the matrix. Many projectors and large monitors provide BNC connectors rather than multi-pin D connectors. The **VP-102** solves this physical incompatibility, and provides the local monitor loop-through, necessary buffering, isolation, and sync processing for electronic compatibility. Note that the **VP-102** does not perform any scan rate conversion. The **VP-102** will accept all typical VGA modes such as VGA, SVGA, and XGA, and output RGsB, RGBS, or RGBHV. Video bandwidth of 315MHz ensures transparent operation at multiple resolutions including XGA. For applications not requiring a local monitor, a rear-panel termination switch is provided eliminating the need for external termination plugs. The **VP102** is rugged, dependable, and runs on standard 230/115VAC via an ordinary detachable AC cord.

❑ **VIDEO TESTER** - A new, unique, patented, indispensable tool for the video professional, the video Tester is used to test a video path leading to/from a Matrix Switcher. By pressing only one touch switch it can trace missing signals, distinguish between good and jittery (VCR sourced) signals, and identify the presence of good signals. Whenever a video signal is missing, because of bad connections, cable breaks or faulty sources, the video Tester is all you need.

❑ **SP-11** - (Video/Audio Processor) can be serially inserted between the Matrix Switcher and the acceptor for video/audio processing. The **SP-11** has 2 Composite video inputs and outputs, 2 Y/C (Super-Video) inputs and outputs as well as 4 stereo-audio inputs and outputs. The **SP-11** has DC coupled video inputs and outputs, and allows full control over the video signal: Video gain down to full fade, log or linear Definition control, log or linear Contrast control, Color saturation control, Black Level control, Red, Green and Blue controls and a Screen Splitter control for "before-after" comparison. Input switch control is "Audio-follow-Video".

5 GETTING TO KNOW YOUR MATRIX SWITCHER

5.1 Features of the VP-88 Matrix Switcher

Front/Rear panel features of the **VP-88** are shown in Figure 1, and Figure 2 and are described in Table 1 and Table 2. *The VP-88 is shown as an example, but the same applies to all the matrices in this group.*
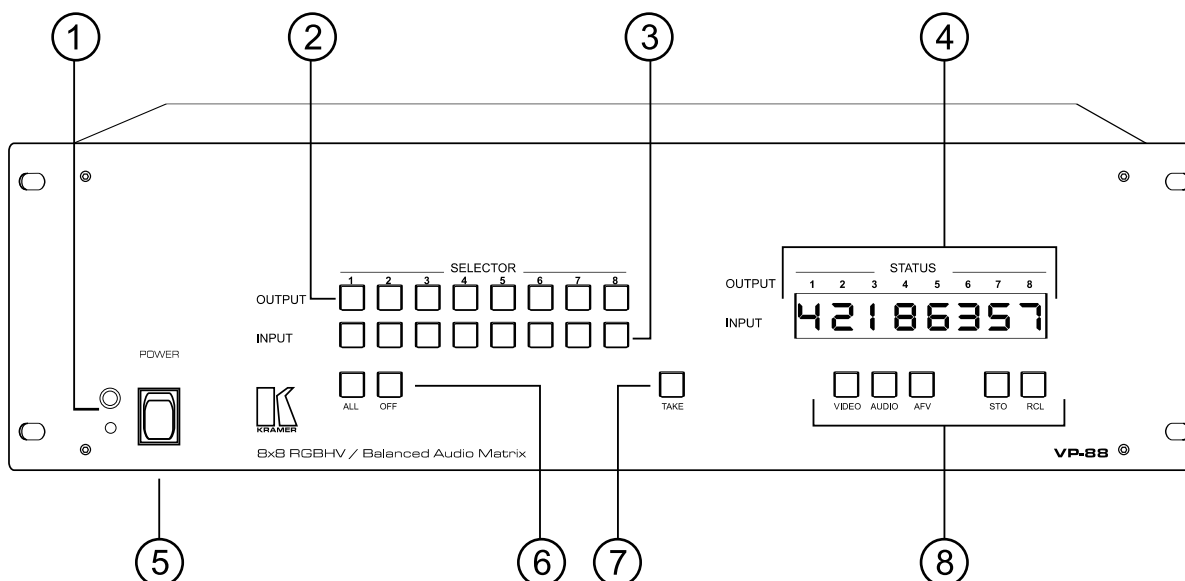

Figure 1: VP-88 Front Panel Features

Table 1: VP-88 Front Panel Features

No.	Feature	Function
1.	**IR** Receiver	The red LED is illuminated when receiving signals from the Kramer Infra-red remote control transmitter
2.	**OUTPUT SELECTOR** buttons	Select the desired output that the input signal is switched to.
3.	**INPUT SELECTOR** buttons	Select the desired input to be switched to the output.
4.	**INPUT STATUS** display	Displays the selected input switched to the output (marked above each input).
5.	**Power** switch	Illuminated switch supplies power to the unit.
6.	**All** and **OFF** controls	Press **ALL**, then an input button, to connect that audio/video input to all audio/video outputs. When **OFF** is pressed after pushing an output button, that video/audio output is disconnected from the video/audio input. To disconnect all the outputs, press **ALL** then **OFF**.
7.	**TAKE**	The machines can operate either in "**Normal"** (no user confirmation for each action is needed) mode or in "**Take"** mode. In "**Take Mode**", any action causes the **TAKE** button to blink before implementation, and **TAKE** must be pressed again in order to implement the operation. Pressing the **TAKE** button toggles the mode. The button illuminates when in "**Take Mode**". **NOTE** *To cancel any operation initiated by pressing a button, press the same button again.*

Table 1: VP-88 Front Panel Features (Cont.)

8.	Additional Control Switches	**VIDEO:** When pressed, illuminates and selects the video mode (Breakaway) to enable modification of the video crosspoints.
		AUDIO: When pressed, illuminates and selects the audio mode (Breakaway) to enable modification of the audio crosspoints.
		AFV: When pressed, illuminates and selects the "**Audio Follow Video**" function. If the audio configuration differs from the video configuration, the **INPUT STATUS** display flashes the audio outputs that are to be reconfigured for **AFV** operation. In that case, the **TAKE** button must be pressed to confirm the modification.
		STO: Should be pressed, followed by an input or output pushbutton to store the current status in the non-volatile memory. For example. Press **STO** followed by **INPUT 4** button to store Setup#4 in the non-volatile memory.
		*NOTE: To delete a setup from the memory, press the **STO** and **RCL** buttons simultaneously, followed by the input button (Setup number) to be deleted.*
		RCL: Should be pressed, followed by input or output pushbutton to select a predetermined setup (1-8 available setups). For example, press **RCL** followed by **INPUT 4** button to recall Setup#4 from the non-volatile memory.

Figure 2: VP-88 Rear Panel Features

Table 2: VP-88 Rear Panel Features

No.	Feature	Function
1.	**H & V** Channels termination switches	These switches, when released, allow the upper input channels to be used for TTL level H & V sync signals (RGBHV operation). When pressed - the input channels become analog video channels, the same as the lower RGB channels, and the machine can be used for 5 identical video channels.
2.	**1-8 AUDIO INPUTS** terminal blocks	Audio inputs used to connect the balanced stereo audio input sources.
3.	**1-8 AUDIO OUTPUTS** terminal blocks	Audio outputs used to connect the balanced stereo audio output acceptors.
4.	**RS-485** terminal block	Used for bi-directional communication with another Matrix Switcher or PC through the RS-485 interface.
5.	**EXT. SYNC** BNC connector	Used to connect an external video sync input. The external sync input is selected by the **SYNC Select** switch.
6.	**SYNC Select** switch	Selects either an external sync, from the external source, or internal sync, which is normally inputted via the **VIDEO INPUT #1** connector.
7.	**VIDEO INPUTS** BNC connectors	Video inputs used to connect the video sources.
8.	**VIDEO OUTPUTS** BNC connectors	Video outputs used to connect the video acceptors.
9.	DB-9 female **RS-232** connector	Used to control the Matrix Switcher (see section 9.4 for more details concerning RS-232 operation) from a PC, or remote control device, through an RS-232 interface and a null-modem adapter (provided with the machine). **NOTE** *Operation of the machine from a remote PC may be done using the **K-Switch** control Software (provided with the machine).*
10.	**Setup** DIP switches	Allow proper configuration of the control signals received and transmitted through the RS-232 (or RS-485) control port, master/slave modifications, line termination and device ID numbers.
11.	Power Connector	A 3-prong AC connector allows power to be supplied to the unit. Directly underneath this connector, a fuse holder houses the appropriate fuse.

6   INSTALLATION

6.1   Rack Mounting

The **VP-88** may be rackmounted in a standard 19" (3U) EIA rack assembly and includes rack "ears" at the ends of the front panel. This device does not require spacing above or below the unit for ventilation. To rack mount the **VP-88**, simply place the unit's rack ears against the rails of the rack, and insert standard screws through each of the four corner holes in the rack ears.

7   CONNECTING TO VIDEO DEVICES

Video / RGBHV sources and output devices may be connected to the **VP-88** through the BNC type connectors located on the back of the unit. When using the matrix for RGBHV signals, all signal connections that use more than one cable interconnecting between devices should be of equal length. (Example: cables between a PC and the machine should be equal in length).

8   CONNECTING TO AUDIO DEVICES

Audio sources and output devices (such as amplifiers or recorders) are connected to the machines through the terminal block connectors located at the back of the machines.

9 USING THE SWITCHERS

9.1 Turning on the Machine

NOTES

1. The machine should only be turned on, after all connections are completed, and all source devices have been turned on. Do not attempt to connect or disconnect any video, audio or control signals to the machine while it is turned on!
2. The socket-outlet should be near the equipment and should be easily accessible. To fully disconnect equipment, remove power cord from socket.

1. Press the pushbutton on the far left-hand side of the front panel. The pushbutton glows.
2. Operate the acceptors.

9.2 Setting Up the Machine

The **VP-88** and the other Matrices of this group may be used for many different applications. The main application is to switch between different RGBHV sources and acceptors. This application uses three large bandwidth video channels, Red, Green and Blue (RGB) and two TTL (logic level) channels - Horizontal and Vertical sync. The cables leading the RGB signals to and from the Matrix should be of the best available quality as high-resolution signals are extremely sensitive to cable quality, and deteriorate fast in low quality, high capacitance video cables. The Horizontal and Vertical Sync channels are less sensitive to cable quality.

When the matrix is to be used in an RGBHV application, the termination switches adjacent to the H & V channels on the back of the machines should be released (TTL position).

In some graphics and multimedia applications, only 4 channels are used – RGBS. The sync channel uses Composite Sync format (not separated to Horizontal and Vertical), and is usually at analog signal levels (1 Volt approx.). Composite sync channel is rarely of the TTL type. In the case where Composite Analog Sync is used (this should be verified by the user from the specification of the RGBS source) the H channel should be used for Composite sync, and the termination switch adjacent to this channel on the back panel should be pressed in (75 Ω position).

Warning: If this channel is not properly set up, damage may incur to the signal source, acceptor or the Matrix!

The composite sync leading cable does not have to be of the best quality, as sync signals do not require extremely high quality cables. A standard, good quality cable should be used.

The Matrix may be used for other video applications – Composite video, Y/C, YUV (Component video) and for average distances, even SDI signals (Serial Digital Video).

When the Matrix is used for analog or SDI signals, the H and V channels may also be used for video and the termination switches adjacent to those channels should be pressed in to the 75Ω position.

The Matrix maybe used for parallel applications, e.g., used simultaneously as a Composite Video, 8x8 Matrix and a Component (YUV) Matrix.

When used as a proper video matrix (The H & V channels are set to 75 Ω), all the 5 channels are identical in specification and bandwidth, and may be used for any application.

When used in mixed applications (such as Y/C and YUV simultaneously) the user should select the parallel output channels for the same format, for example, if the Red and Green Channels are used for Y/C (The Red for "Y" and the Green for "C") then the output channels should be used similarly (Red for "Y" and Green for "C").

In a mixed signal application all the input channels are selected simultaneously. For example, if used for Y/C and YUV parallel switching, then when input number 1 is selected, it selects both input number 1 of the Y/C AND input number 1 of the YUV channel.

9.3 Using the Front Panel Controls

The front panel of the VP-88 is designed to be simple to operate, and accomplish the basic function of selecting input sources and output devices.

9.3.1 Selecting an Output

Output selection on the Matrix Switchers is made by pressing any of the buttons marked "**1**" through "**8**" on the front panel (for the **VP-88**). These buttons correspond to output connections as marked on the back panel.

9.3.2 Selecting an Input

Input selection on the Matrix Switchers is made by pressing any of the buttons marked "**1**" through "**8**" on the front panel (for the **VP-88**). These buttons correspond to input connections as marked on the back panel.

9.3.3 Connecting a Video/Audio Input/Output

To connect a video/audio Input to a specific output, press the desired output button (upper row), followed by the desired input button (lower row).

9.3.4 Disconnecting a Video/Audio Input

To disconnect a video\audio Input from a specific output, press the desired output button followed by the **OFF** button. To disconnect all the outputs, press the **ALL** button, followed by the **OFF** button.

9.3.5 Connecting a Video/Audio Input to All Outputs

To connect a video\audio Input to all outputs, press the **ALL** button followed by the **INPUT** button corresponding to the input which is to be routed to all the outputs.

9.3.6 Selecting Video/Audio Control (Breakaway)

For audio control only, press the **AUDIO** button. For video control only, press the **VIDEO** button. Note that the **STATUS** window displays audio or video settings in accordance with the selection.

9.3.7 Using the "Audio Follow Video" Mode

To select "Audio Follow Video" mode, press the **AFV** button. Note that if the audio configuration differs from the video configuration, the differing audio outputs blink in the **STATUS** window of the audio display. The **AUDIO** and **TAKE** buttons blink as well, which means that the audio configuration will be modified for AFV operation. Press the **TAKE** button to confirm the modification.

9.3.8 Storing a Configuration

To store a configuration, press the **STO** button, followed by input or an output button to mark the setup number. For example, press **STO** followed by **INPUT#3** button to store the current configuration in **Setup#3** in the internal non-volatile memory of the switcher. To abort an operation of the **STO** button once it was pressed, press it again.

9.3.9 Recalling a Configuration

To recall a configuration, press the **RCL** button, followed by an input or an output button, marking the setup number. For example, press **RCL** followed by **INPUT# 3** button to recall **Setup#3** from the internal non-volatile memory of the switcher. To abort an operation of the **RCL** button once it was pressed, press it again.

9.3.10 Deleting a Setup

To delete a setup, press both the **STO** and the **RCL** buttons followed by the input button corresponding to the setup number which is to be deleted.

9.3.11 Using the "Take" Function

To activate the "**Take**" Function, press the **TAKE** button (the **TAKE** button illuminates). After each pressing of the above-mentioned buttons, the **TAKE** button blinks together with the relevant numbers in the **STATUS** display. Confirmation of the action is implemented by pressing the **TAKE** button again (the **TAKE** button then stops blinking). If no button is pressed, the **STATUS** display keeps on blinking for one minute and the function will be aborted. To abort implementing an operation in "**Take"** mode, press that button which originally caused the display to blink.

9.3.12 Resetting the Machine

To reset the machine, press **INPUTS** buttons "**1**", "**2**" and "**3**" simultaneously. The machine resets itself and a 7-segment self-test is automatically performed.

9.4 Using the Back Panel Controls

The switcher ID numbers, the RS-232 / RS-485 settings, and the sync source selection are all configured on the back panel of the machine.

9.4.1 Selecting the Sync Source

Input sync selection is made using the "**Sync Select**" button located on the back panel. For an external sync operation, press the "**Sync Select**" button. For an internal sync operation, release the "**Sync Select**" button. This modifies the input circuitry to select the required input sync source.

9.4.2 Setting the Configuration Switches

A bank of DIP switches located on the back panel of the **VP-88** set the configuration switches. Table 3 describes the settings and configurations for each of the DIP switches. To set the configuration switches, confirm that power to the Matrix Switcher is OFF, and with a small flathead screwdriver, move the DIP switches to the "**ON**" or "**OFF**" position as shown in Table 3 and Figure 3. Master/Slave DIP switches configure the Matrix Switcher for operation in a multiple switcher configuration. If a Matrix Switcher is operating and being controlled independently, it should be assumed that it is operating in the "Master" configuration.

Up to 8 Matrix Switchers may be cascaded for control via a single port by configuring one Matrix Switcher as a "master", or ID number "**1**", while all the others are assigned as slave Matrix Switchers or an ID other than "**1**". When RS-232 connection is implemented, **DIP switch #8** allows you to enable RS-232 communication between the Matrix Switcher and the PC. This is desirable, so that the controlling device "knows" that the controlled device has carried out its instructions. When RS-485 connection is used for communication between the Matrix Switcher and the PC, **DIP switch #8** should be up ("**OFF**"). In some applications, it may be desirable for some machines not to reply to instructions received on the RS-232 and RS-485 ports. In this scenario, you would disable the "**Reply**", or acknowledgement commands. **DIPswitch #5** enables or disables "**reply**" from the Matrix Switcher to the PC.

In the case of interconnection between more than two RS-485 receivers-transmitters (including PC), the termination resistor must be disconnected on all the devices, except the first and last machines on the communication line. **DIP switch#4** connects or disconnects the termination resistor.

Table 3: DIP Switches Configuration

MACHINE NUMBER	SELF ADDRESS			DIP SWITCH			DIP switch #4	"ON"= Connects the termination resistor. "OFF"= Disconnects the termination resistor.
	2	**1**	**0**	**3**	**2**	**1**	DIP switch #5	"ON"= Enables reply from switcher to PC. "OFF"= Disables reply from switcher to PC.
1. (Master)	0	0	0	ON	ON	ON	DIP switch #6, DIP switch #7	**Not used**
2.	0	0	1	ON	ON	OFF	DIP switch #8	"ON"= Enables RS-232 communication between switcher and PC. "OFF"= Enables RS-485 communication between switcher and PC.
3.	0	1	0	ON	OFF	ON		
4.	0	1	1	ON	OFF	OFF		
5.	1	0	0	OFF	ON	ON		
6.	1	0	1	OFF	ON	OFF		
7.	1	1	0	OFF	OFF	ON		
8.	1	1	1	OFF	OFF	OFF		
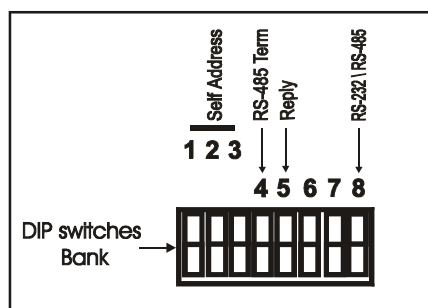
Figure 3: DIP switches- General View

9.5 RS-232 and RS-485 Operation

The computer RS-232 communication port or the RS-485 terminal block connector connects your switcher to a PC. Bear in mind that serial communication between Matrix Switchers is always via RS-485 (see example in Figure 5). The RS-232 port is either a DB-9 (9-pin port) or DB-25 (25-pin port). The cable connecting your switcher to the PC should be wired as shown in Figure 4. A 9-25 pin adapter or 9-9 pin null-modem adapter is included for your convenience. The null-modem adaptor is wired as shown in figure 4. If you use the adaptor

(which is recommended), plug it into the PC's serial port, and connect from the other end of the adaptor to your switcher via a flat-cable. Please keep in mind that it is not recommended to extend an RS-232 signal beyond a length of 30 feet, without the use of an RS-232 to RS-422 converter at both the PC and the switcher.

If, for example, five machines and a PC are cascaded together using RS-485 interconnection, disconnect the termination resistors on all machines except the fifth (see Figure 6). For a similar setup, without a PC connected on the RS-485 line, disconnect all resistors except for the first and fifth machines.
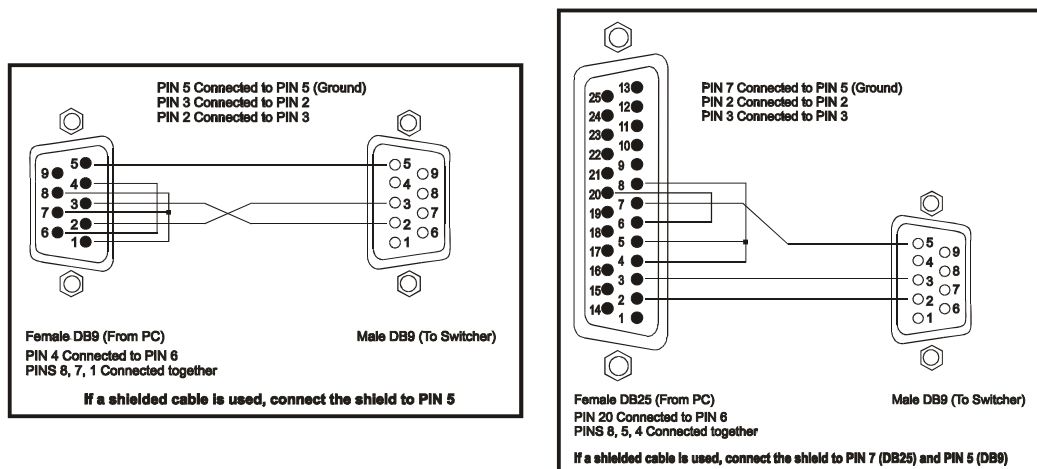
Figure 4: RS-232 Control Connector Wiring
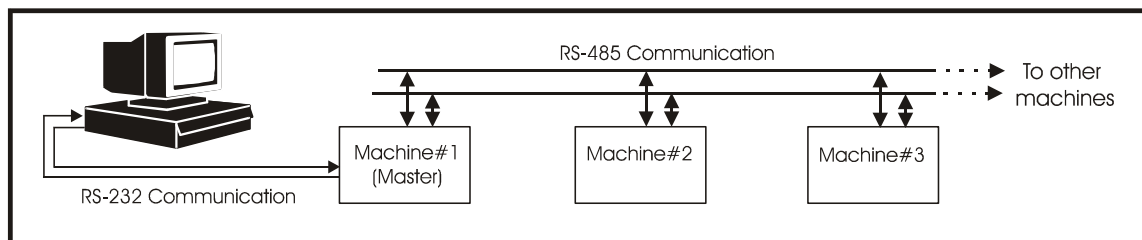
Figure 5: RS-232 and RS-485 Operation
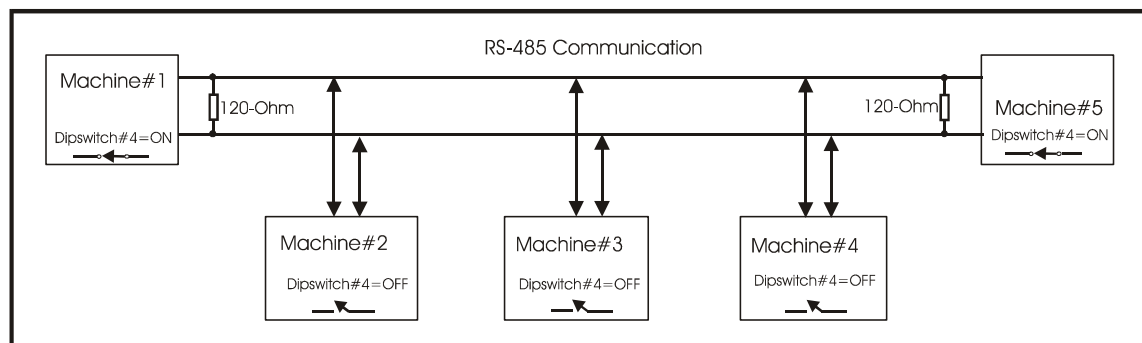
Figure 6: Terminating the Line

9.6   The PC Control Software

9.6.1   Installation

NOTE

*The "**K-Switch**" PC Control Software is described below. Another software package, "**Kontrol**", is also available on the CD provided with the machine. Both these programs are user-friendly, and most of the details below also apply to **Kontrol**. If the CD was not provided, the software is also available for free download at Kramer's web site: www.kramerelectronics.com at the technical support section. The software at the website is the latest version of the program, and the user should check the site regularly for updates.*

To install the Control Software perform the following steps:

1. Insert the CD into the drive of your PC.
2. From within Windows95/98 ® run the **Setup.exe** file on the CD and follow the instructions.
3. The software & icon are automatically installed in a specific destination folder on the hard disk.
4. Once the program ends its installation procedure, it is ready for its first run.

9.6.2 Software Controls

The software controls function as described below:

❖ **Machine Number** (where applicable)
   - o The number of the machine in a group of chained Matrix Switchers, where each machine can be addressed individually using this option. Note that machine number **"1"** is always the Master.

❖ **INPUT** selector buttons
   - o When clicked, select the inputs to be connected to the output/s. The input button default color is blue and it turns red (for video) or yellow (for audio) when connected (clicked). Disconnecting an input is implemented by clicking the relevant input button again.

❖ **OUT** buttons
   - o This function is used to select an output and controls numbers, buttons and descriptions of corresponding outputs of the active switcher that are to be connected with the different inputs. The output button default color is blue and it turns yellow when connected (clicked). Disconnecting an output is implemented by clicking again the relevant output button.

NOTE

When modification of both video and audio crosspoints had been performed, the relevant crosspoint buttons turn half red/half yellow.
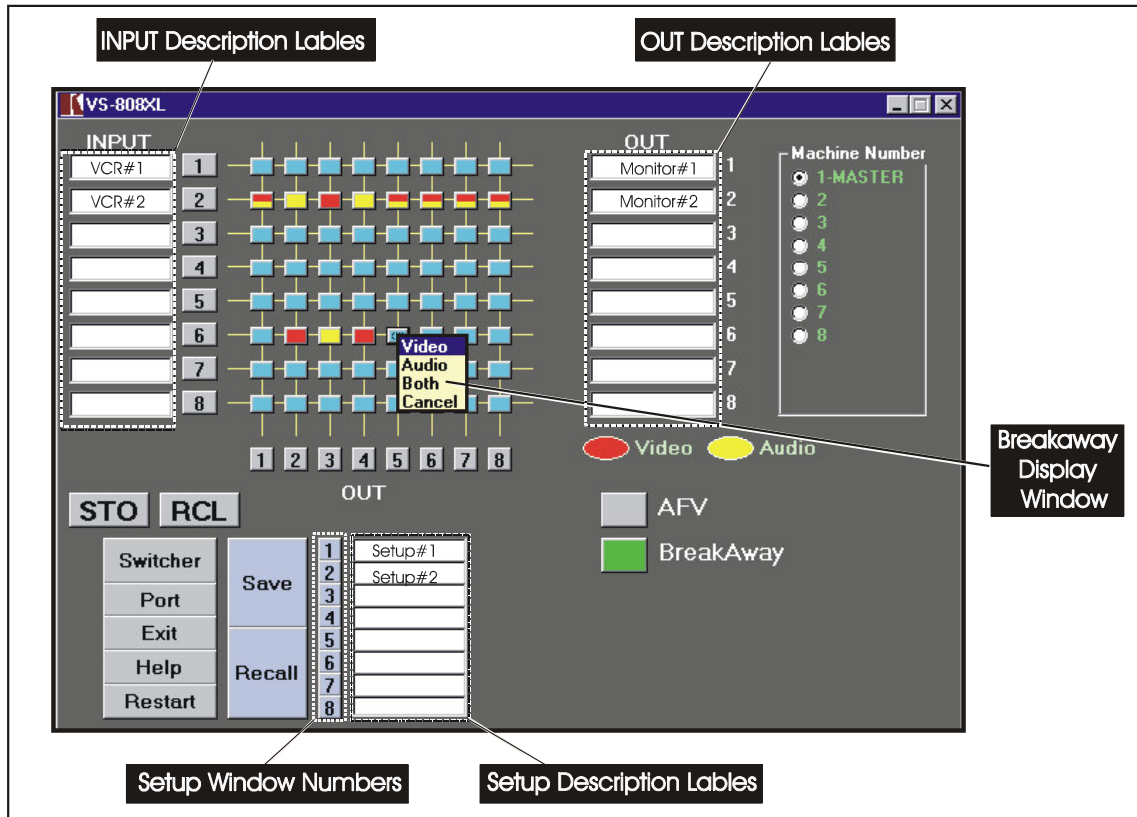
❖ **AFV button**
   - o When clicked, selects the "Audio Follow Video" mode to enable AFV setting modification.

- ❖ **Breakaway** button
  - o When clicked, followed by crosspoint modification, the **Breakaway** window appears to enable separate audio and video modification. The user can select the desired mode: **Video** (video is modified only), **Audio** (audio is modified only), **Both** (combined audio & video modification) or **Cancel** (abort current operation).
- ❖ **STO** button
  - o When clicked, a sub-menu list of setups appears and the user selects the required setup number from the list. The current status is then stored in the non-volatile memory of the switcher. (1-8 available setups for the VP-88).
- ❖ **RCL** button
  - o When clicked, a sub-menu list of setups appears, and the user selects a predetermined setup from the list and then prompted whether he wants to load the current setup. Note that preoccupied setups locations appear dim.

NOTE

Whenever a new setup is determined by the user, the old setup in the same location is deleted! You are prompted if you really want to delete the old setup.

- ❖ **Save** button
  - o When clicked, saves the current configuration of all the chained Matrix Switchers: To save the configuration: click on **Save** and then click on the desired **Setup Window Number.** Note that after clicking **Save**, the setup number buttons blink in red when occupied and in green when free. The saved setup can be recalled by clicking the **Recall** button.

NOTE

Canceling Save/Recall functions and deactivating Setup Number buttons can be implemented by clicking the Save/Recall buttons once again, or by clicking the right button of the mouse.
The Save function actually enables storing of additional setups in the PC's memory. The setups can be named in the Setup Description Labels (see below).
- ❖ **Recall** button
  - o When clicked, recalls a saved configuration (via the **Save** function) of all the chained Matrix Switchers in the <u>PC's memory</u> and displays this on the screen. To recall a configuration, click on the **Recall** button and then select the desired **Setup Window Number.**
- ❖ **Switcher** button
  - o When clicked**,** allows you to select a different switcher model from the Switcher screen. When Switcher screen appears, select the desired switcher and then click <u>Select.</u>
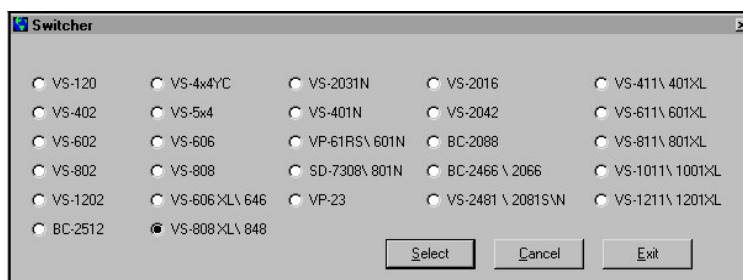
- ❖ **Port button**
  - o Defines the active serial port (**COM1-COM4**) to which the Matrix Switcher is connected. To select a port, click on the **Port** button. When the **Port** screen appears, select the desired port and then click **O**k. Switching a number from 1-4 followed by clicking the **Save** button**,** changes the active port number.
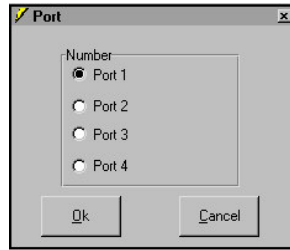
❖ **Help** button
  o When clicked, a **Kramer Switchers Help** screen appears, allowing you to view either the Communication protocol (by clicking the **Communication Protocol** button), or the current software version (by clicking **About).** Click **Ok** after the selection is complete.
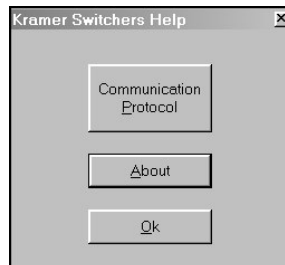
❖ **Restart** button
  o When clicked**,** displays the current configuration of the connected switcher on the screen.
❖ **Exit** button
  o When clicked, allows you to exit the program. You are prompted if you really want to exit.
❖ **Input Description Labels**
  o Used by the operator to name a selected input source. The input source name is saved when the **Save** button is clicked.
❖ **OUT Description Labels**
  o Used by the operator to name a selected output acceptor. The output acceptor name is saved when the **Save** button is clicked.
❖ **Setup Description Labels** (located to the right of **Save** & **Recall** buttons)
  o Used by the operator to name each setup. The setup names correspond to the **Setup** window numbers and are stored when the **Save** button is clicked. Note that when a setup location is already occupied, the relevant **Setup** window number turns red.

10   TYPICAL APPLICATIONS

10.1 A Basic RGBHV-Audio Setup

Figure 7 describes a typical RGBHV-Audio setup using the VP-88. Three RGBHV-audio sources, two RGBHV-audio acceptors, and a genlock source are connected to the machine, while control of the Matrix Switcher is implemented via the PC using RS-232 communication. The VP-88 is capable of switching a maximum of 8 RGBHV-audio inputs to 8 RGBHV-audio outputs simultaneously, one input/output on each 5 BNC connectors block. The machine can switch Composite, Y/C, Component video, RGBS, etc., as explained before. While switching the video signals, the VP-88 can also switch 8x8 balanced stereo audio channels in "audio-follow-video" mode, where audio signals are routed to one or more of the output devices, or in "audio breakaway" mode, where audio signals are routed to different output devices.
Perform the following steps (as necessary):

1. Connect all RGBHV-audio sources to the RGBHV-audio inputs of the Matrix Switcher.
2. Connect all RGBHV-audio acceptors to the RGBHV-audio outputs of the Matrix Switcher.
3. Operate the Matrix Switcher, PC sources and acceptors.
4. Select the required video input to be switched, using front panel input selector pushbuttons (or the **K-Switch** program controls).
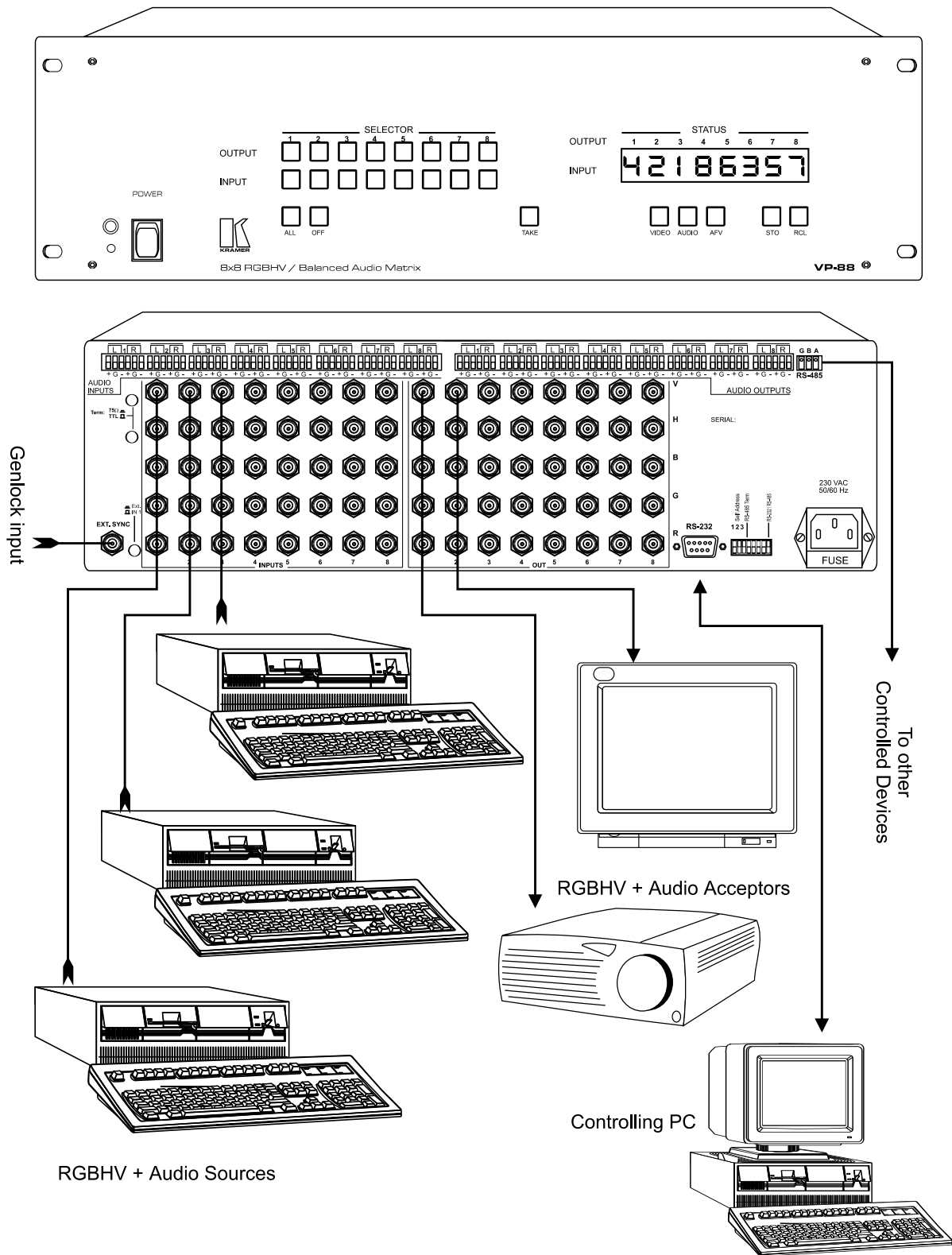
Figure 7: A Basic RGBHV-Audio Setup

11 TAKING CARE OF YOUR MATRIX SWITCHER

Do not locate your Matrix Switcher in an environment where it is susceptible to dust or moisture. Both of these may damage the electronics, and cause erratic operation or failure. Do not locate your **Matrix Switcher** where temperature and humidity may be excessive. Doing so may also damage the electronics, and cause erratic operation or failure of your Matrix Switcher. Do not clean your Matrix Switcher with abrasives or strong cleaners. Doing so may remove or damage the finish, or may allow moisture to build up. Take care not to allow dust or particles to build up inside unused or open connectors.

12 TROUBLESHOOTING

NOTES

1. *Please note that if the output signal is disturbed or interrupted by very strong external electromagnetic interference, it should return and stabilize when such interference ends. If not, turn the power switch off and on again to reset the machine.*
2. *If the recommended actions still do not result in satisfactory operation, please consult your KRAMER Dealer.*

12.1 Power And Indicators

Problem	Remedy
No power	1. Confirm that the rocker switch is in the "ON" position, and that the lamp is illuminated. 2. Confirm that power connections are secured at the machine and at the receptacle. Make sure the receptacle is active, outputting the proper mains voltage. 3. If there is still no power, check the fuse. Remove power cord from the AC outlet and from the machine and then, using a flat screwdriver, remove the fuse holder located directly below the power connector. Confirm that the fuse is good by looking at the wire connected to the ends of the fuse. If the wire is broken, replace the fuse.

12.2 RGBHV Signal

Problem	Remedy
No RGBHV at the output device, regardless of input selected.	1. Confirm that your sources and output device are turned on and connected properly. RGBHV signals connected to the input of your machine should be of an identical signal format at the output of your source. Video signals at the output of your machine should be of an identical signal format as at the input of your display or recorder. 2. Confirm that any other switchers in the signal path have the proper input and/or output selected. 3. Check for proper termination of the Hs and Vs channels.
RGBHV level is too high or too dim at a certain input or output.	1. Verify that the RGBHV line is well matched through 75ohm impedance; otherwise it results in a video level that is too high or too dim. 2. Confirm that the connecting cables are of high quality, properly built and terminated with 75ohm BNC connectors. Check level controls located on your source input device or output display or recorder. 3. Use, if needed, for the required input or output a Kramer line amplifier such as the VP-22. You might need in this application VGA to RGBHV cables.
Colors at one or more outputs are completely wrong	1. Check proper connection, if the RGB cables were not swapped around at the inputs or the outputs.

Problem	Remedy
Noise bars "roll" up or down in the output image or: Low Frequency Hum in the audio output	Hum bars (ground loop) are caused by a difference in the ground potential of any two or more devices connected to your signal path. This difference is compensated by passing that voltage difference through any available interconnection, including your RGBHV/video cables. **WARNING**! ***Do not disconnect the ground from any piece of video equipment in your signal path!*** Check the following to remove hum bars: 1. Confirm that all interconnected equipment is connected to the same phase of power, if possible. 2. Remove equipment connected to that phase that may introduce noise, such as motors, generators, etc. 3. Disconnect all interconnect cables and reconnect them one at a time until the ground loop reappears. Disconnect the affected cable and replace, or insert an isolation transformer in the signal path.

12.3 Audio Signal

Problem	Remedy
No audio at the output device, regardless of input selected	1. Confirm that your sources and output device are turned on and connected properly. Audio signals connected to the input of your machine should be properly wired to the output of your source. Audio signals connected to the output of your machine should be properly wired to the input of your machine or recorder. 2. Confirm that any other amplifiers in the signal path have the proper input and/or output selected. Pay special attention to input amplifiers that may be built into your acceptor. 3. Check for the polarity of the balanced audio signals and for proper ground connection.
Audio level is too low	1. Confirm that the connecting cables are of high quality and properly built. Take special care in noting the wiring configuration of balanced to unbalanced cables. 2. Check level controls located on your source input device or output display or recorder.

12.4 Control

Problem	Remedy
No control of Matrix Switcher from PC software	1. Confirm the wiring of the connecting cable. This pin configuration may be found in Figure 4. Cable length should not exceed 25 feet. 2. Confirm that all DIP switches on the Matrix Switcher have been set properly. Keep in mind that if you are only controlling one Matrix Switcher on a specific port, that Matrix Switcher must be assigned the ID of "1". 3. Confirm that the baud rate of your computer COM port is set to the same as that of your Matrix Switcher (9600-Baud). Confirm that the proper COM port is selected in the control software. 4. Confirm that bi-directional communication is enabled on all Matrix Switchers. Please refer to section 9.4.2 "Setting the Configuration Switches" for proper configuration for your Matrix Switcher. 5. With custom software, do not send multiple commands at the same time. The Matrix Switcher must complete one command and send the reply, before receiving another. 6. Confirm that the computer you are using supports true RS-232C protocol. Computers such as the Apple Macintosh do not!

12.5 Switching Malfunctions

Problem	Remedy
The switcher succeeds in switching a number of sources then fails to switch one.	Malfunction in the particular source or cable assembly. **NOTE** *The most common failure mode in transferring the signal of an audio source is a break in the connecting wire.* Disconnect the source from a channel that is switching successfully and connect the suspect source to it. If the channel continues to switch successfully, there is something wrong with the Matrix Switcher or the suspect source was not connected properly. If it does not continue to switch successfully, then there is something wrong with the source or cable assembly. Check them.

13   COMMUNICATION PROTOCOL

Communication with the **VP-88** uses four bytes of information as defined below. Data is transferred at 9600 baud with no parity, 8 data bits and 1 stop bit.

1st byte

	DESTINATION	INSTRUCTION					
0	D .	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
MSB							LSB

2nd byte

				INPUT			
1	0	0	0	I3			
7	6	5	4	3			

3rd byte

				OUTPUT			
1	0	0	0	O3			
7	6	5	4	3			

4th byte

					MACHINE NUMBER		
1	0	0	0	0	M2	M1	
7	6	5	4	3	2	1	

1st BYTE: Bit 7 – Defined as "0",   D – "DESTINATION BIT"
This bit is always "low", when sending from the PC to the Matrix Switchers, and "high" for information sent to the PC.
N5…N0 – "INSTRUCTION".
The function that is to be performed by the Matrix Switcher (s) is defined by these 6 bits. Similarly, if a function is performed via the machine's keyboard, then these bits are set with the **INSTRUCTION #** which was performed. The instruction codes are defined according to the table below (**INSTRUCTION #** is the value to be set for N5…N0).

2nd BYTE: **Bit 7 – Defined as "1".**
                          Bits 4 – 6 - Defined as "0".
                          I3… I0 – "INPUT".
When switching via RS-232 for RS- 485 (for instruction codes 1 and 2), these bits set the input that is to be switched. Similarly, if switching is done via the machine's keyboard, then these bits are set with the input number which was switched. For disconnect, set as 0. For other operations, these bits are defined according to the table.

3rd BYTE: **Bit 7 - Defined as "1".**
                  Bits 4-6 Defined as "0".
                  O3 – O0 – "OUTPUT".
When switching via RS-232 or RS-485 (for instruction codes 1 and 2), the output to switch is set by these bits. Similarly, if switching is done via the machine's keyboard, then these bits are set with the output number that was switched. For other operations, these bits are defined according to the table.

4th BYTE: **Bit 7 – Defined as "1".**
                  Bits 3-6 Defined as "0".
                  M2… M0 – "Machine Number".
                  Machine Number = (DIP – Switch Code) + 1.

	INSTRUCTION	DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET MACHINE	0	0	1
1	SWITCH VIDEO	Set equal to video input to be switched	Set equal to video output to be switched (0=to all the outputs)	2
2	SWITCH AUDIO	Set equal to audio input to be switched	Set equal to audio output to be switched (0=to all the outputs)	2
3	STORE STATUS	Set as SETUP #(1-8)	- To store parameters - to delete setup	2,7

4	RECALL STATUS	Set as SETUP #(1-8)	Don't care	2,7
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #(1-8)	Equal to output number whose status is read	3,7
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP #(1-8)	Equal to output number whose status is read	3,7
7	VIS SETTING	Don't care	- for immediate switching - for VIS switching	2
8	BREAKAWAY SETTING	Don't care	- for audio-follow-video - for breakaway	2
9	NOT USED			
10	REQUEST VIS SETTING	Set as SETUP #(1-8)	Don't care	3,7
11	REQUEST BREAKAWAY SETTING	Set as SETUP #(1-8)	Don't care	3,7
12 to 14	NOT USED			
15	REQUEST WHETHER SETUP IS DEFINED	Set as SETUP #(1-8)	Don't care	4
16	ERROR/BUSY	Don't care	Don't care	5
17	RESERVED			6
18	RESET MACHINE	0	0	1
19	STORE STATUS	Set as SETUP #(1-8)	0-to store parameters 1-to delete setup	2,7,9
20	RECALL STATUS	Set as SETUP #(1-8)	Don't care	2,7,10
21 to 56	NOT USED			
57	SET AUTO-SAVE	for auto save 0 – no save	Don't care	8,2
58 to 60	RESERVED			
61	IDENTIFY MACHINE	1or 2 – machine name 3 or 4 – version	Don't care	11

NOTES ON THE ABOVE TABLE:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it performs the instruction, and if the instruction is performed (due to a keystroke on the front panel), then these codes are sent. For example:

```
0000 0001
1000 0101
1000 1000
0011
```

was sent from the PC, then the switcher (machine#3) will switch input 5 to output 8. If the user switched input#1 to output#7 via the front panel keypad, then the switcher will send:

```
0100 0001
1000 0001
1000 0111
1000 0011      ⇒ to the PC.
```

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it sent (except for the first byte, where the DESTINATION bit is set "high").

NOTE 3 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per

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the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number#5 is breakaway setting, then the reply to

0000 1011		0100 1100
1000 0001	Would be ⟹	1000 0001
1000 0000		1000 0001
1000 0101		1000 0101

NOTE 4-The reply to the "REQUEST WHETHER SETUP IS DEFINED" is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined; or 1 if it is defined.

NOTE 5-An error code is returned to the PC if an invalid code was sent to the switcher (e.g. trying to save to a setup greater than 8, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 6–This code is reserved for internal use.

NOTE 7-SETUP #0 is the present setting. SETUP #1 to SETU P#8 are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 8-Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, auto-save function is set.

NOTE 9–This is identical to instruction 3 (machine uses instruction 3, when sending to PC).

NOTE 10–This is identical to instruction 4 (machine uses instruction 4, when sending to PC).

NOTE 11-This is a request to identify the switcher/s in the system. If the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, the reply to the request to send machine name (for machine number 001) would be:

0111 1101	
1000 1000	(i.e. 128 + 8)
1000 1000	(i.e. 128 + 8)
1000 0001	

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it.

For example, for version 3.5, the reply would be:

0111 1101	
1000 0011	(i.e. 128 + 3)
1000 0101	(i.e. 128 + 5)
1000 0001	

TABLE OF HEX CODES FOR THE MASTER VP-88

The table below shows the "HEX" codes for switching the master VP-88.

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	01	01	01	01	01	01	01	01
	81	81	81	81	81	81	81	81
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 2	01	01	01	01	01	01	01	01
	82	82	82	82	82	82	82	82
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 3	01	01	01	01	01	01	01	01
	83	83	83	83	83	83	83	83
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 4	01	01	01	01	01	01	01	01
	84	84	84	84	84	84	84	84
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 5	01	01	01	01	01	01	01	01
	85	85	85	85	85	85	85	85
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 6	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 7	01	01	01	01	01	01	01	01
	87	87	87	87	87	87	87	87
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 8	01	01	01	01	01	01	01	01
	88	88	88	88	88	88	88	88
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81

LIMITED WARRANTY

Kramer Electronics (hereafter Kramer) warrants this product to be free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site **www.kramerelectronics.com**.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
    a) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature.
    b) Unauthorized product modification, or failure to follow instructions supplied with the product.
    c) Repair or attempted repair by anyone not authorized by Kramer.
    d) Any shipment of the product (claims must be presented to the carrier).
    e) Removal or installation of the product.
    f) Any other cause, which does not relate to a product defect.
    g) Cartons, equipment enclosures, cables or accessories used in conjunction with the product.

WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

Kramer's liability for any defective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

NOTICE

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47	FCC Rules and Regulations: Part 15- "Radio frequency devices: Subpart B- Unintentional radiators

CAUTION!

⊠ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.

⊠ Use the supplied DC power supply to feed power to the machine.

⊠ Please use recommended interconnect cables to connect the machine to other components.

For the latest information on our products and a list of
Kramer distributors, visit our Web site:
www.kramerelectronics.com.
Updates to this user manual may be found at
http://www.kramerelectronics.com/manuals.html.
We welcome your questions, comments and feedback.